

Appln. No.: 09/806,423
Amendment Dated May 21, 2007
Reply to Final Office Action of December 22, 2006 and
Advisory Action of April 18, 2007

WBF-100US (formerly SSM-488US)

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Amendments to the Claims: This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Previously Presented) A vacuum distillation plant for concentrating a solution, comprising:
 - a) an evaporator for producing an overhead product and a bottoms product;
 - b) vapor concentration means downstream of said evaporator to receive said overhead product;
 - c) a multi-stage condenser downstream of said vapor concentration means to condense at least a portion of said overhead product into a liquid condensate;
 - d) rectification means between said condenser stages; and
 - e) means for maintaining a substantially constant ratio of more volatile to less volatile constituents in the solution undergoing concentration, said means for maintaining the ratio comprising a recycling line connected between the multi-stage condenser and a pump installed in said recycling line for recycling at least part of said condensate from the condenser to said bottoms product of said evaporator.
- 2-3. (Canceled).
4. (Previously Presented) A vacuum distillation plant according to claim 1 wherein two to four condensation stages are provided with a rectification interposed between each of said condensation stages.
5. (Previously Presented) A vacuum distillation plant according to claim 1, wherein said pump is a membrane pump.
6. (Previously Presented) A vacuum distillation plant according to claim 5 comprising two condensation stages.
7. (Previously Presented) A vacuum distillation plant according to claim 1 wherein the condensate is recycled into the evaporator above the liquid level of the bottoms product.

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8. (Previously Presented) A vacuum distillation plant according to claim 1 wherein the condensate is introduced into and mixed with the bottoms product and the mixture is introduced into the evaporator.

9. (Previously Presented) A vacuum distillation plant according to claim 1, additionally comprising means for actively directing the bottoms product through the condenser.

10. (Original) A vacuum distillation plant according to claim 9 wherein the means for actively directing the bottoms product is a circulating pump.

11. (Previously Presented) A vacuum distillation plant according to claim 1 comprising a pre-vacuum pump in addition to the concentration means.

12. (Original) A vacuum distillation plant according to claim 11, wherein the pre-vacuum pump is an oil-driven liquid-ring pump.

13. (Previously Presented) A vacuum distillation plant according to claim 1, comprising means on the condensate side for depositing solid and/or liquid components entrained in the overhead product.

14. (Previously Presented) A process for concentration of an aqueous alcoholic solution comprising the steps of:

a) placing said solution under vacuum in an evaporator to form an overhead product and a bottoms product;

b) pressurizing and transporting said overhead product to a multi-stage condenser having rectification means between the condenser stages;

c) condensing at least a portion of said overhead product by rectification in said multi-stage condenser into a liquid condensate; and

d) recycling at least part of said liquid condensate to said bottoms product of said evaporator to maintain a substantially constant ratio of more volatile to less volatile constituents in the solution in the evaporator.

15. (Canceled).

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16. (Previously Presented) A process according to claim 14, wherein two condensation steps are carried out in step c) starting from binary solutions and wherein at least part of the condensate of the second step is recycled to the bottoms product.

17. (Previously Presented) A process according to claim 14, wherein the condensate is recycled in an amount so that the water to alcohol ratio of the solution in the bottoms product remains constant.

18. (Canceled).

19. (Previously Presented) A process according to claim 14 including the steps of concentrating aqueous ethanolic plant drug extracts having an ethanol content of at least 20 vol.%.

20-26. (Canceled).

27. (Previously Presented) A vacuum distillation plant according to claim 4, wherein all or part of the condensate of the last condensation stage is recycled to the evaporator.

28-29. (Canceled).

30. (Previously Presented) A vacuum distillation plant according to claim 4, wherein the condensate is recycled to the evaporator above the liquid level of the bottoms product.

31. (Previously Presented) A vacuum distillation plant according to claim 5, wherein the condensate is fed into the evaporator above the liquid level of the bottoms product.

32. (Previously Presented) A vacuum distillation plant according to claim 6, wherein the condensate is recycled into the evaporator above the liquid level of the bottoms product.

33-34. (Canceled).

35. (Previously Presented) A vacuum distillation plant according to claim 4, wherein the condensate is introduced into and mixed with the bottoms product and the mixture is introduced into the evaporator.

36. (Previously Presented) A vacuum distillation plant according to claim 5, wherein the condensate is introduced into and mixed with the bottoms product and the mixture is introduced into the evaporator.

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37. (Previously Presented) A vacuum distillation plant according to claim 6, wherein the condensate is introduced into and mixed with the bottoms product and the mixture is introduced into the evaporator.

38. (Previously Presented) A vacuum distillation plant according to claim 7, wherein the condensate is introduced into and mixed with the bottoms product and the mixture is introduced into the evaporator.

39. (Previously Presented) A process according to claim 14, wherein two condensation steps are carried out in step c) starting from binary solutions and wherein at least part of the condensate of the second stage is recycled to the bottoms product.

40. (Previously Presented) A process according to claim 14, wherein the condensate is recycled in such an amount that the water to alcohol ratio of the solution in the bottoms product remains constant.

41. (Previously Presented) A process according to claim 16, wherein the condensate is recycled in such an amount that the water to alcohol ratio of the solution in the bottoms product remains constant.

42. (Canceled).

43. (Previously Presented) A process according to claim 16, wherein the bottoms product is distilled by flash evaporation.

44. (Previously Presented) A process according to claim 17, wherein the bottoms product is distilled by flash evaporation.

45. (Previously Presented) A process according to claim 14, including the steps of concentrating aqueous ethanolic plant drug extracts having an ethanol content of at least 20 vol.%.

46. (Previously Presented) A process according to claim 16, including the steps of concentrating aqueous ethanolic plant drug extracts having an ethanol content of at least 20 vol.%.

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47. (Previously Presented) A process according to claim 17, including the steps of concentrating aqueous ethanolic plant drug extracts having an ethanol content of at least 20 vol.%.

48. (Previously Presented) A process according to claim 14, including the steps of concentrating aqueous ethanolic plant drug extracts having an ethanol content of at least 20 vol.%.

49. (Previously Presented) A process according to claim 14, including the step of concentrating aqueous ethanolic plant drug extracts having an ethanol content of from 30 to 70 vol.%.

50. (Currently Amended) A process for concentrating a plant extract in the form of an aqueous alcoholic solution comprising the steps of:

a) placing the solution under vacuum in an evaporator to form an overhead product and a bottoms product being a concentrated plant extract;

b) pressurizing and transporting said overhead product to a multi-stage condenser having rectification means between the condenser stages;

c) condensing at least a portion of said overhead product by rectification in said multi-stage condenser into a liquid condensate; and

d) recycling at least part of said liquid condensate to said bottoms product of said evaporator to maintain a substantially constant ratio of more volatile to less volatile constituents in the solution in the evaporator.

51. (Canceled).

52. (Previously Presented) A vacuum distillation plant according to claim 1 comprising a discharge pipe for conveying the bottoms product from the evaporator to the multi-stage condenser where the bottoms product acts as a heat carrier that absorbs heat, said plant further comprising a circulation line for recycling the bottoms product from the multi-stage condenser back into the evaporator.

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53. (Previously Presented) A process according to claim 14 comprising the step of conveying the bottoms product from the evaporator to the multi-stage condenser where the bottoms product acts as a heat carrier that absorbs heat.

54. (Previously Presented) A process according to claim 50 comprising the step of conveying the bottoms product from the evaporator to the multi-stage condenser where the bottoms product acts as a heat carrier that absorbs heat.